# ATCO NEWSLETTER

1992 EVENT TO BE HELD 4 OCTOBER

For the sixth consecutive year, ATCO members will get together for an afternoon to enjoy meeting with ATV friends. Lunch will be served at 2:00 PM and will be followed by an interesting program. Again, this year's event chairman is Rick, WA3DTO. Details are on page 3.

From I-70 east or west bound: Take Route 315 (just west of downtown Columbus) and head NORTH. Get off at the Ackerman Road Exit and turn RIGHT onto Ackerman Road. Turn LEFT just beyond first traffic light at the ATCO sign.

If north bound on I-71: Watch for the split to Route 315 just south of Columbus. Take 315 and head NORTH to Ackerman Road Exit and turn RIGHT onto Ackerman Road. Turn LEFT just beyond the first traffic light at the ATCO sign.

If south bound on I-71: Take I-71 to the I-270 bypass loop and head WEST. At the Route 315 Exit, turn LEFT and head SOUTH. Get off at Ackerman Road Exit and turn LEFT. Proceed through one traffic light and turn LEFT at the ATCO sign.
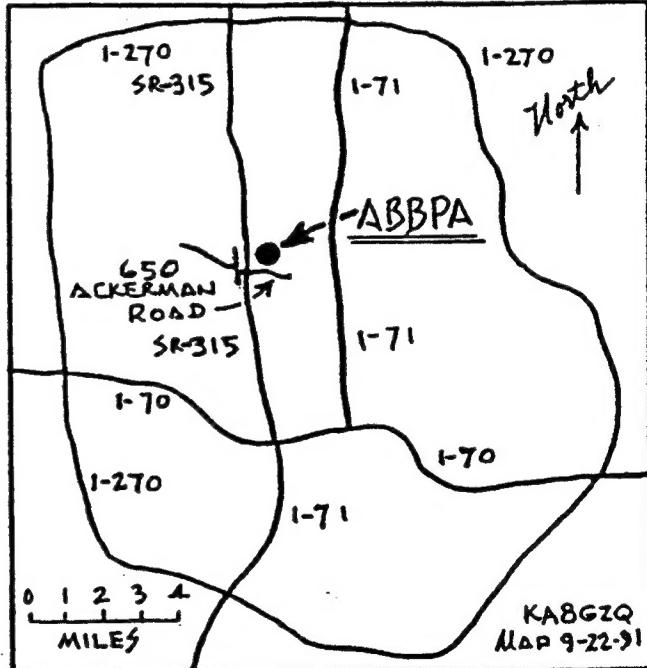
****
The ATCO Newsletter is the official publication of a group of television amateurs known as "AMATEUR TELEVISION IN CENTRAL OHIO" and is published in January, April, July, and October.

Membership in ATCO is open to any FCC licensed radio amateur who has an interest in amateur television.

HDTV NEWS

For High Definition Television (HDTV), the FCC wants to keep the current commercial TV channel allocation plan with its 6 MHz wide channel allocation. HDTV proponents believe the only way to cram more than twice the detail of NTSC video into 6 MHz of spectrum is to "compress" their signal formats at certain times such as image movement or scene changes. By compressing the baseband images using certain digital or analog algorithms, the proposed HDTV systems attempt to shoehorn 1050 or more scan lines into a 6 MHz channel. When this is done, viewers will notice a loss of picture quality (1) whenever images move across the screen (as TV images normally tend to do); and (2) at the time of any scene change.

Ham operator and ATV experimenter Leo Zucker, K2LZ, of White Plains, New York, has developed a HDTV broadcasting system that overcomes this problem, and his invention was recently awarded a U.S. patent.

K2LZ's approach does not require compression of the video image being transmitted in order to remain within a 6 MHz channel bandwidth and, furthermore, offers compatibility with existing NTSC receivers. A very big advantage, indeed. Basically, K2LZ simply weaves two 525 line transmitted NTSC signals transmitted on the same frequency into one and ends up with 1050 line HDTV resolution! The TV set actually receives two signals — the second overlapping the first. He has proved it works on the 70 cm ham band!

During the initial tests of the system, two ATV transmitters were operated at the same time on a common carrier frequency of 434.0 MHz. The secret of the system is simultaneous transmission and receipt of horizontal and vertical polarized signals.

The two transmitters were connected to separate horizontal and vertical yagis — each modulated with a NTSC video signal. Depending on the polarization of the receiver/monitor antenna, it was possible to detect and view the two simultaneously radiated video signals on the same screen without noticeable crosstalk. The approach allows effectively up to 12 MHz of uncompressed video detail to be radiated within a 6 MHz RF spectrum channel. Instead of using twice the bandwidth, you simply use twice the transmitters.

K2LZ's system uses "orthogonal coherent radiation" to provide an NTSC-compatible HDTV signal format as follows: A 1050 line high definition image produced by a studio camera or other source is separated into two 525 line images. One frame is composed of all the odd lines of the original image and the other frame is composed of all the even image lines. The two frames are

ATCO

1992 FALL EVENT

2:00 PM - SUNDAY
OCTOBER 4, 1992

ABB PROCESS AUTOMATION (ACCURAY)

*** SHELTERHOUSE ***
650 ACKERMAN ROAD

XYL'S AND YL'S WELCOME
BRING A FRIEND

GOOD LUNCH   GOOD FRIENDS
SHOW AND TELL   DOOR PRIZES

DETAILS? CALL RICK, WA3DTO, 877-0652

PI = 3.14159265358...
By Bob, W8TV

As we all should know from high school arithmetic, the area of a circle is found by the formula: A = PI times the radius squared, or "PIE ARE SQUARED." But, all good amateur-TV-types know that "PIE ARE ROUND," as evidenced by the delicious taste-test of Mom's homemade kitchen pastries.

In the circular system of measuring angles, either of two units are normally used --> degrees or radians. Most all computer mathematical computations use the system of RADIAN measurement, particularly in the BACIC or GW-BASIC language. Also electrical engineering formulas use the radian system, such as the computing the angular velocity of the armature of an alternator which is measured in "electrical radians per second."

This unit of RADIAN angle measurement is defined as "that central angle of any circle which is subtended by an arc of the circle equal in length to the radius," from which we obtain the fact that there are two PI radians in 360 degrees (one complete electrical cycle), or PI radians in 180 degrees.

A very interesting idiosyncrasy of the circle is this constant PI, whose symbol comes from the 16th letter of the Greek alphabet (which has only a total of 24 characters!). PI is never exact, but it is a never ending decimal no matter how far it may be carried, that is, to no matter how many decimals it is always the same for every circle! By long hand calculations many centuries ago, a Chinese mathematician has been reported to have computed this constant to 740 decimal places! That was many, many moons ago, long before the days of the TV "boob-tube" and other forms of visual and aural entertainment we now have in the 20th century.

Much interest in the circle has centered around the true value of PI; and, for thousands of years mathematicians and others of all races attempted to find its absolute value. This problem of finding the actual value of PI is, therefore, referred to as the problem of "squaring the circle." And, it was not until the year 1768 that PI was definitely proven to have no such exact value; therefore, it is impossible to "square the circle."

To calculate the "approximate" value of PI, the following simple BASIC computer program can be written into most computers (remember the angle of measurement here is in radians):

```
10 CLS: REM THIS CLEARS THE SCREEN
20 REM: PI = 16 arctan 1/5 - 4 arctan 1/239
25 PI=16*ATN(1/5) - 4*ATN(1/239
30 PRINT PI: REM THIS PRINTS TO THE MONITOR SCREEN
40 LPRINT PI: REM THIS WILL PRINT PRINTER HARDCOPY
```

16 ELEMENT LOOP YAGI
FOR 439.25 MHz
By Dale, WA8KQQ

For the boom of my 16 element loop Yagi antenna, I used a 10-foot
length of 1/2 inch aluminum conduit. All spacing measurements
were made from the back end of the boom, and #9 wire was used for
the elements. This wire was stripped from 3/4 inch aluminum TV
cable which turned out to be #9 copper wire, and so it soldered
very well.

The reflectors and directors were cut to length, flattened 1/2
inch on either end, and formed into a circle.   The ends were
soldered together, and then ground or filed down to wire size.
One-half inch conduit clamps (the kind with a bolt through them)
were used for the element mounts. I used a file on edge to file
a notch across the top of each clamp for the wire ring to set in
and soldered the ring to the clamp with a propane torch.   This
provided a sturdy mount that looked quite decent.   The bolt
through the bottom of the clamp provides for easy adjustment for
tuning the antenna.

The driven element was made using the same #9 wire flattened on
either end and also in the center. A piece of brass tubing from
a hobby shop was used for a feed. Drill a hole in one end and
in the middle of the #9 wire to pass the brass tubing through and
a small hole on the other end of the #9 wire for the center
conductor. Form the circle then pass the brass tube through the
two large holes and solder. Then set the ring on top of a
conduit clamp with the tube passing down through the hole and
solder.

Make the measurement for the spacing of the driven element on the
boom and then drill a hole through the boom to snugly pass the
brass tube. Slide the tube through the hole and let the clamp
spread to snap on the boom. Drill tiny holes on either side of
the clamp through the boom and set with two small metal screws.
Two different sizes of brass tube can be used.   One size will
pass the center conductor with insulation (RG-58) or the next
size will pass with ground braid, also. I tried both ways and
each worked okay.

Pass the center conductor of the coax through the small hole of
the driven element and solder. Then solder the braid to the top
of the brass tubing. A coax fitting under the boom may be used
or a balun may be used if using twin lead as I do.

This antenna is on a test stand at 22 feet and my normal 48
element collinear is at 55 feet. Dick, W8RVH, 42 air miles away
on the morning we tested the antennas gave me a P-4.5 on the
collinear and a P-3.5 on the loop Yagi. This was a very good

ATCO QUIZ
By Bob, W8TV

1. An audio intermodulation measurement involves — A: the use of two tones. B: the use of one tone. C: the use of two tones out of phase. D: the use of three tones.

2. The unit of measurement between two audio levels is — A: hertz. B: farad. C: decibel. D: dyne.

3. An omnidirectional mike will pick up sounds essentially from — A: front and rear. B: front only. C: front and sides only. D: one side only. E: all sides.

4. An ammeter in the antenna circuit of an AM transmitter is measuring 2 amperes RF current for an unmodulated carrier. If the carrier is modulated 100 percent by a sine wave, what is the expected new antenna current? — A: 4.00 amps. B: 3.45 amps. C: 2.45 amps. D: 6.00 amps. E: 2.45 milliamps.

5. If an AM transmitter on 890 kHz is modulated with a tone of 7500 Hz, the lower sideband frequency is — A: 882.5 kHz. B: 880.0 kHz. C: 815.0 kHz. D: 900.0 kHz.

6. If the potential across the circuit is 40 volts and the current is 5 amperes, what is the resistance? — A: 20 ohms. B: 8 ohms. C: 10 ohms. D: 8 henrys.

7. A lamp operating at 120 volts has a resistance of 240 ohms. What is the wattage of the lamp? — A: 2 watts. B: 200 watts. C: 60 watts. D: none of the above.

Answers are on page 9.

****

73 TO B&W TV SETS, ALMOST

According to a recent Associated Press report, except for miniature models, black-and-white TVs have faded from view. Even in discount stores such television sets are rarely seen and many of the biggest retail chains no longer sell them.

Stores that do sell B&W TVs usually won't sell anything bigger than the small models with screen sizes typically ranging from a few inches to seven inches.

The Electronic Industries Association estimates that nearly all of America's 94 million households have at least one color TV set, and that about half still have some kind of black-and-white set around.

16 ELEMENT LOOP YAGI
FOR 439.25 MHz
(continued from page 5)

report considering the difference in height of the two antennas. I also found that on 70 cm the loop tunes differently than on 1.2 GHz. At 1.2 GHz, the loop can be tuned by changing the shape of the driven element. On 70 cm, this did not make much change at all, but moving the first director made a considerable change. I think this is a good antenna, and I have just finished the second one. I am going to stack a pair to see what happens.

I would appreciate receiving any suggestions anyone may have. My telephone number is 513-548-2492 or mail address is 225 Riffle Avenue, Greenville OH 45331.

Element information:
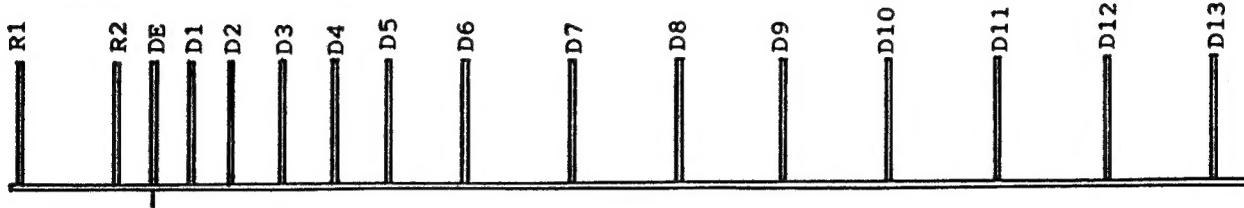
2 Reflectors 29-3/8"; 1 Driven 27-15/16"; 13 Directors 25"

Spacing in inches:

R1 = 1	D2 = 18	D6 = 39-5/16	D10 = 82-1/16
R2 = 9-5/16	D3 = 23-3/8	D7 = 50-1/16	D11 = 92-3/4
DE = 12-1/16	D4 = 28-5/8	D8 = 60-11/16	D12 = 103-7/16
D1 = 15-1/2	D5 = 32-3/8	D9 = 71-3/8	D13 = 114-1/8

****

ATV TUESDAY NIGHT NET

Several ATVers are meeting each week at 9:00 PM on an informal basis. Tune in on 147.45 MHz and keep up with ATV activity in Central Ohio.
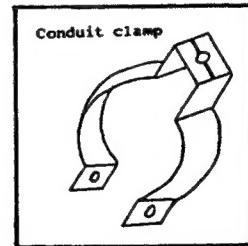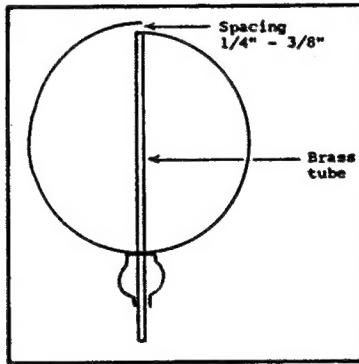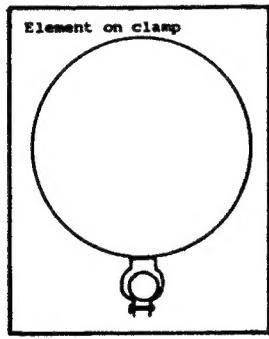
HDTV NEWS

transmitted simultaneously in the conventional NTSC 2-field interlaced format using separate transmitters operating on the same TV channel.

One transmitter is connected to a horizontally polarized antenna and the other to a vertically polarized antenna. Conventional TV receivers therefore reproduce standard 525 line images using their existing horizontal antennas. New HDTV receivers will use a vertically polarized antenna in addition to a horizontal one (probably on the same boom), and have appropiate circuitry to interleave all the separately detected 1050 image lines in the proper sequence and timing for a high resolution display screen. The original HDTV image can then be viewed without distortion or other artifacts due to compression.

Most of the broadcasting equipment needed to implement K2LZ's proposed system (transmitters and antennas) are already in existence and would not become a financial burden to TV broadcasters who will otherwise be forced to purchase complex and studio equipment necessitated by other systems now under consideration. Nonetheless, a non-NTSC compatible version of K2LZ's system can be implemented to allow high definition images to be transmitted in digital or even frequency modulated (FMTV) form with little or no baseband compression.

In a Second Report and Notice of Proposed Rule Making released 8 May 1992, the FCC referred to K2LZ's system as a new development in the HDTV standards setting program. Additional performance data for the system is now being gathered for submission to the FCC. (From W5YI Report 1 July 1992. Submitted by Dave, KB2ARL.)

****

10 YEARS AGO
September 1982

The ATV Repeater was undergoing final testing and clean-up. Chuck, WB8LGA, had a major battle with every repeater's nightmare: desense, but the repeater was very near desense free at the 100 watt power level.

Two slot antennas were built, and Art, WA8RMC, was leading the charge on the horizontally polarized antennas. The repeater site was on a 106 foot tower in Westerville. Repeater frequencies were listed as 439.25 in and 425.25 MHz out.

Photos of the WB8LGA ATV Repeater taken at the June 1982 ATV meeting were included in the September 1982 ATCO Newsletter.

PI = 3.14159265358...

Running this program will yield a figure of 3.141593; however, this is a "rounded" answer due to the limitations of normal PC's (personal computers). By using the ENIAC COMPUTER at the Ballistic Research Laboratories at the Aberdeen Proving Ground, Maryland, PI was computed by using the above formula to 2040 places -->3.14159265358979323846264338327950288419716939937510583 09749445923078164062862089986280348253421170679821480865132823066 ... and so on to the 2040th place!!!

If you'd like a copy of the entire printout of the PI generated by the ENIAC ELECTRONIC COMPUTER, please contact W8TV.

(A shortened version of this article was originally published in the October 1989 issue of the ATCO Newsletter. - Editor.)

****

ATCO FINANCIAL STATEMENT

Cash balance as of 30 June 1992: $601.37. Receipts: none. Expenditures: printing charges for July 1992 ATCO Newsletter $14.15; postage for July 1992 ATCO Newsletter $8.99; miscellaneous costs incidental to publication of newsletter $5.55; total expenditures $28.69. Summary: cash balance as of 30 June 1992 $601.37; receipts none; expenditures $28.69; balance as of 20 September 1992 $572.68.

Note: in the financial report published in the July 1992 newsletter, an incorrect date was shown. The report should have read "Summary: cash balance as of 31 March 1992."

The above financial report was prepared as of 20 September 1992 by Warren G. Duemmel, KA8GZQ, ATCO Acting Treasurer.

****
ANSWERS TO "ATCO QUIZ" - 1: A. 2: C. 3: E. 4: C. 5: A. 6: B. 7: C.
****

5 YEARS AGO
October 1987

The 1987 ATCO Measuring Party and Get-Together was held on Saturday 19 September at WB8URI's QTH and was attended by 35 members and guests.

1.2 GHz ATV testing was continuing. During July, August, and September, active stations were W8DMR, N8DUK, WB8EHW, WA8EOY, WA8RUT, W8RVH, WA8TTE, WB8UGV, WB8URI, and K8YAH.
****

```
K8AEH  Wilbur Wollerman...1672 Rosehill Rd.........Reynoldsburg  43068
 W8AER David Sears........1678 Kaiser Dr...........Reynoldsburg  43068
AH2AR  David Pelaez.......4872 Trailside Court.....Huber Heights  45424
 W8ARE Terry Meredith.....1524 Ashdowne Rd.........Columbus  43221
KB2ARL Dave DiGiuseppe..391-3A Directory Dr........Columbus  43213
WA8ATF Emmett McDonald...14120 Flintridge Rd. SE...Glenford  43739
 W9AZO Jim Walter........2662 St.Rt. 39 NW RD#3...Mansfield  44903
KB8BIY Bob Shaw.............59 Parkview Ave........Westerville  43081
 W8CCW John Ferrell.......3722 Wagner Court........Grove City  43123
N8CYV  Blaire Standley.....721 West North St.......Springfield  45504
WA3DTO Rick White.........5314 Grosbeak Glen.......Orient  43146
 W8EHW Foster Warren.......124 East Clark St.......North Hampton  45349

WA8EOY John Schlaechter...3199 Lewis Rd...........Columbus  43207
 N8FFO Edward Hauff.......2716 Columbus Ave........Columbus  43209
WH6FL  Chris Jacoby....98-1689 Hapaki St..........Aiea HI  96701
KB9FO  Henry Ruh.........1545 Lee Street Suite 73.Des Plaines IL 60018
KB8GZO Jason Pelaez.......4872 Trailside Court.....Huber Heights  45424
KA8GZQ Warren Duemmel.....3488 Darbyshire Dr.......Hilliard  43026
 K8HRR Ira Bickham........260 Tiki Dr.............Merritt Is. FL 32953
 K8HVA Guy Cunningham, Jr...31 Birchfield St.......Plymouth  44865
 K8ISM Steve Iacono.......1075 Virginia Ave.......Columbus  43212
 K8JGY Fred Yost..........330 Dellfield Way.......Gahanna  43230
 N8KCB Chris Morris.......3181 Gerbert Rd.........Columbus  43224
WA8KQQ Dale Waymire........225 Riffle Ave.........Greenville  45331

N8LRG  Phillip Humphries..2137 Summer Breeze Dr....Columbus  43223
KB8MDE Shaun Miller.......3469 Oakcrest Rd........Columbus  43232
WB8OTH Perry Yantis.......1850 Lisle Ave..........Obetz  43207
KE8PN  James Easley.......1507 Michigan Ave.......Columbus  43201
WA8RMC Arthur Towslee......180 Fairdale Ave.......Westerville  43081
WA8RUT Ken Morris.........3181 Gerbert Rd.........Columbus  43224
 W8RVH Richard Goode......9391 Ballentine Rd.......New Carlisle  45344
 N8TUU Maxine Duemmel.....3488 Darbyshire Dr.......Hilliard  43026
 W8TV  Bob Dye............6118 Sedgwick Rd.........Columbus  43235
WB8UGV Bruce Jaquish......4817 W. Arlington Park...Fort Wayne IN 46835
WB8URI William Heiden.....4435 Kaufman Rd.........Plain City  43064
KA8WGX Martha Yost........330 Dellfield Way.......Gahanna  43230
```

****

73 TO B&W TV SETS, ALMOST

While the trade group projects more than 20 million color TVs
will be shipped in the United States this year, the estimate for
black-and-white sets is only about one million.

If you really want a B&W picture, just turn the color down.

REVISED OHIO 2 METER REPEATER MAP

OHIO 2 METER REPEATERS BY COUNTY AND COUNTY SEAT
Prepared by WB8YUS--Send additions or corrections to WB8YUS & W8CQK.
Please Duplicate for Free Distribution.

WILLIAMS Bryan 682-

FULTON Wauseon 7195+

LUCAS Toledo 694- 7375+ 712+ 727+ 661-679- 7345+

OTTAWA Port Clinton 7075+

SANDUSKY Fremont 535- 691-

ERIE Sandusky 6655-

LORAIN Elyria 523- 7225+ 670- 7285+ 6625- 715+

Painesville **LAKE** 712+721+ 533-549- 7165+ 7345+ 7255+

ASHTABULA Jefferson 667- 6715- 739+

Cleveland **CUYAHOGA** 676-673-688-531- 515-736+543-685- 529-679-706+ 521-7195+ 682-

GEAUGA Chardon 7015+ 694-

TRUMBULL Warren 6835- 697- 6685- 511- 7105- 7045-

DEFIANCE Defiance 7225+ 709+

HENRY Napoleon 7315+ 541-

WOOD Bowling Green 718+

MEDINA Medina 703+

SUMMIT Akron 531-661- 664-724+ 727+730+ 6985-733+ 6115+709+

6085+

PORTAGE Ravenna 539- 6895-

MAHONING Youngstown 700+6865-527- 545-6745-7375+ 7225+ 7315+

691-

PAULDING Paulding 6865-

PUTNAM Ottawa 6715-

HANCOCK Findlay 715+ 7045+

SENECA Tiffin 519- 545- 721+

HURON Norwalk 6805-

ASHLAND Ashland 7105+

WAYNE Wooster 6715- 739+

STARK Canton 537- 6955- 541- 712+ 549- 718+ 679-

COLUMBIANA Lisbon 670- 6805-

VAN WERT Van Wert 685- 670-

ALLEN Lima 517- 667- 694- 703+ 712+

WYANDOT Upper Sandusky

CRAWFORD Bucyrus 685-

RICHLAND Mansfield 527- 547- 533- 694- 736+

MERCER Celina 661-

AUGLAIZE Wapakoneta 733+

HARDIN Kenton 6625-

MARION Marion 6895- 730+

MORROW Mt Gilead

HOLMES Millersburg 513- 667-

6925- 673-

CARROLL Carrolton

JEFFERSON Steubenville 706+

SHELBY Sidney

LOGAN Bellefontaine 525- 537- 700+ 6835-

UNION Marysville 739+ 535-

DELAWARE Delaware 517- 529-

KNOX Mt Vernon 679-

COSHOCTON Coshocton 523-

TUSCARAWAS New Philadelphia

HARRISON Cadiz 6655-

DARKE Greenville 679- 718+

MIAMI Troy 523- 724+ 721+

CHAMPAIGN Urbana 7375+

CLARK Springfield 531- 545- 673-

FRANKLIN Columbus 721+ 6805-733+ 553- 697- 543- 519- 706+549- 667- 709+511- 724+ 712+ 676- 715+

LICKING Newark 537- 688-

MUSKINGUM Zanesville 661-

GUERNSEY Cambridge 685-

BELMONT St Clairsville 521- 664- 727+

PREBLE Eaton 547-

MONTGOMERY Dayton 7195+736+ 541-543- 549-664-682- 691-692-511-533- 7075+7105+713+ 6775-6985-7015+

GREENE Xenia 7045+ 7165+

MADISON London 7285+

PICKAWAY Circleville 718+ 6835-

FAIRFIELD Lancaster 670- 703+

PERRY New Lexington

NOBLE Caldwell

MONROE Woodsfield 724+

BUTLER 661- **Hamilton** 6715- 515-523- 697- 517-537- 7515+ 519-539- 733+

WARREN Lebanon 513- 6865- 529-

CLINTON Wilmington 712+

FAYETTE Washington Court House 6685- 727+

ROSS Chillicothe 685- 6925-

HOCKING Logan 7345+

MORGAN McConnelsville

WASHINGTON Marietta 688- 697-

HAMILTON 688-700+ **Cincinnati** 703+ 521-531-545- 6625-667-6925- 670-676-706+709+ 715+ 724+517- 685-730+527-535-

CLERMONT Batavia 7225+ 7345+ 6655-

HIGHLAND Hillsboro 6745- 721+ 6685-

PIKE Waverly

JACKSON Jackson 679-

VINTON McArthur

ATHENS Athens 673- 515- 694- 715+ 6625-

MEIGS Pomeroy

BROWN Georgetown 673-

ADAMS West Union 700+ 739- 718+

SCIOTO Portsmouth 539- 736+

GALLIA Gallipolis 706+

LAWRENCE Ironton 6715-

Revised 5/17/92

Your RX frequency is shown with a + or - sign to show the 600KHz. offset for TX. EXAMPLE: 676- is 146.76 RX and 146.16 TX.

****

OUR CONTRIBUTORS

Thanks to the following ATCO members for their contributions to this issue of the ATCO Newsletter: Dave, KB2ARL; Rick, WA3DTO; Dale, WA8KQQ; and Bob, W8TV.

****
...ATCO 1992 FALL EVENT TALK-IN ON 147.45 MHZ...
****

ATCO

1992 FALL EVENT

2:00 PM - SUNDAY

OCTOBER 4, 1992

DETAILS ON PAGES 1 AND 3